

# College Students' Innovation and Entrepreneurship based on Data Mining Word Segmentation Analysis Research on Ability Training

Jiachen Liu

China Civil Aviation Flight University, Guanghan, Sichuan, China

## Abstract

Under the background of "mass entrepreneurship and innovation", the research on college students' innovation and entrepreneurship has been hot since 2014, but only a small number of scholars have put forward ideas on the cultivation of college students' innovation and entrepreneurship ability from the perspective of ability, and have not subdivided and analyzed the importance of ability, which leads to the lack of pertinence and universality of the training mode. Ability is the embodiment of personal comprehensive quality. It is the foundation of successful entrepreneurship. Through data capture software, this paper analyses the news of massive entrepreneurship cases of college students, classifies the words according to the five dimensions of OBAFO ability, and establishes the training methods and objectives through "significant indicators" and their corresponding abilities, so as to analyze and sort the abilities that affect entrepreneurship. The training plan with pertinence is put forward. The final conclusion is that the tendentious ability training can stimulate college students' innovation and entrepreneurship vitality and improve the success rate of transformation. The cultivation of college students' innovative and entrepreneurial ability should cooperate with the construction of entrepreneurial colleges and universities, build a "government-industry-university-research" cooperation platform based on projects, promote college students' practice and enhance team cooperation. At the same time, professional stratification should be carried out according to the characteristics of disciplines, so as to make the training more targeted.

## Keywords

**Data Mining; Innovation and Entrepreneurship; College Students; Ability Training.**

## 1. Introduction

Since the concept of "mass entrepreneurship and innovation" was put forward, all sectors of society have made efforts for China's innovation and entrepreneurship and economic development. As an important platform for social talent output, colleges and universities are in the forefront of the cultivation of innovation and entrepreneurship ability. In recent years, various colleges and universities have published reports on the employment quality of graduates. The "entrepreneurship rate" is regarded as an important indicator of the quality of employment. The report of the Nineteenth National Congress of the Communist Party of China also points out that we should speed up the goal of building an innovative country, in which the cultivation of innovative talents is the basis of building an innovative country, and innovation and entrepreneurship education is the way. At the same time, China's innovation and entrepreneurship education is still in the initial stage of exploration and growth, aiming at the key and difficult points in the current development. On October 8, 2018, the Ministry of Education issued the Opinions on Accelerating the Construction of High-level Undergraduate Education and Improving the Ability of Personnel Training in an All-round Way, which

mentioned two elements of the reform of innovation and entrepreneurship education, one is to strengthen the practice of innovation and entrepreneurship, and to build a docking platform between college students'innovation and entrepreneurship and social needs; Secondly, we should strengthen the construction of innovative and entrepreneurial demonstration universities.Improve the level of innovation and entrepreneurship education[1] It emphasizes the necessity of combining innovation and entrepreneurship education with practice and the importance of the construction of "entrepreneurial" universities. Therefore, how to efficiently cultivate innovative talents, stimulate the vitality of college students'entrepreneurship and improve the success rate of entrepreneurship is an urgent problem to be solved.

## 2. Model Construction

Entrepreneurial ability is a collection of knowledge, skills and attitudes that entrepreneurs possess and contribute to the success of entrepreneurship. [2]. Therefore, for the complex composition of entrepreneurial ability, it is necessary to combine the research of scholars and decompose and define the dimensions of innovation ability from multiple perspectives, which is helpful to clarify ideas and focus on the process of cultivating innovation and entrepreneurship ability in Colleges and universities. The cultivation of innovative and entrepreneurial ability in colleges and universities is based on the development of entrepreneurial universities.Therefore, the related concepts of entrepreneurial university can be used as a reference for research. Burton Clark has proposed five development paths for the transformation to an entrepreneurial university, including a strong control core, a broad development periphery, a diversified funding base, an activated academic heartland, and an integrated entrepreneurial culture (Burton Clark 2003).It is believed that these five ways are essential elements that can not be less. Taking the five-element model as the basis of the entrepreneurial ability training model in colleges and universities, combined with the development direction and characteristics of colleges and universities, the model construction is more universal and forward-looking.

Based on Clark's theory of entrepreneurial university, through reading the literature and synthesizing the research results related to entrepreneurial ability, this paper defines entrepreneurial ability as OBAFO ability. Where "O" is Opportunity, that is, opportunity ability, including self-recognition ability and opportunity recognition ability. In the complex social and business environment, it is a leap from innovation to entrepreneurship.Opportunity ability is the most difficult and difficult ability to grasp, which has individual differences and is difficult to imitate. Some scholars also mentioned that entrepreneurial opportunity identification, as an initiative, has a strong subjective color, and the individual factors of entrepreneurs play an important role. [3]. Therefore, entrepreneurial ability is based on a more complete self-awareness, representing the accumulation process from quantitative change to qualitative change. "B" stands for Bear. With Wang Feirong, Xie Yaping, Wang Huafeng and other scholars as representatives, many scholars have incorporated the factor of "failure learning" into the influence of entrepreneurial ability and intention.Through the analysis of the indicators, the dimension of "bearing capacity" is summarized. "A" stands for Action. Based on the influence of comprehensive conception ability and execution ability on entrepreneurship, the action ability is constructed, which represents the degree of realization of innovative ideas brought about by specific actions and execution. The strength of action ability directly affects the conversion rate from innovation to entrepreneurship. "F" stands for Financing,That is, the ability to finance, including the ability to co-ordinate financial activities. Economic activities run through the whole process of entrepreneurship. According to the life cycle theory, entrepreneurship projects need financial support in the incubation period, growth period and maturity period. Economy is the cornerstone of entrepreneurship, and financing ability is a factor that can not

be ignored. The last "O" stands for Operation, That is to say, operation ability and management ability determine the stability and sustainability of entrepreneurship development. The success of entrepreneurship is not a short-term result, but a stable state. Stable entrepreneurship requires the company's management ability, including the ability to grasp human capital and the ability to formulate company strategy.

**Table 1.** OBAFO five-dimensional scale

Dimension	Indicators
Opportunity Competency	1. Identify market areas with potential 2. Self-awareness ability-can accurately grasp their own strengths and weaknesses. 3. Ability to seize high-quality action opportunities and implement them
Bearing capacity (B)	4. Be able to endure the pressure and changes in work, and persist in adversity. 5. Self-adjustment after failure 6. Take timely remedial measures to solve the problems and difficulties in the company's operation
Mobility (A)	7. Be able to put ideas into practice and produce certain results. 8. Have participated in campus or social practice 9. Share and discuss ideas with others
Financing capacity (F)	10. Able to finance in various ways 11. Understand and gain support for government policies 12. Have financial management awareness and ability
Operational capacity (O)	13. Ability to effectively lead, monitor and motivate staff 14. Reasonable allocation of internal human, financial, material and other resources 15. Be able to analyze the company's position in the industry and formulate corresponding strategic plans.

### 3. Research Content and Method

According to the innovation of research methods under the background of big data, through the search of keywords in the massive database of "Baidu News", the cases of entrepreneurs who meet the research purpose are screened out, and on the basis of the theory of innovation ability, the content and meaning of word segmentation related to them are excavated. The selection of massive news data crawling as a research object is random and objective. It has the value of studying the characteristics and commonness of successful entrepreneurs.

#### (1) Data mining

In this paper, through data mining software, Baidu News is searched for the key words of "College Students' Entrepreneurship Stories", the setting value of page turning is 1000, and the sorting method is "focus sorting" (focus sorting pays attention to relevance and timeliness, which makes the research object random and timeliness), and a total of 497 related news are captured. Fifty-six news articles containing the results of the "contest" were removed from the headlines. the time was set from 2015 to 2018, and 351 eligible news items were finally screened out.

Through the analysis of news by text analysis method, 164 successful samples of entrepreneurship are screened out, and the text is revised (the descriptive content of entrepreneurship process is screened out), so that the research results are more scientific and accurate.

**Table 2.** OBAFO five-dimensional scale word segmentation classification table

Dimension	Indicators	Participle
Opportunity Competency	1. Identify market areas with potential 2. Self-awareness (the ability to accurately grasp their strengths and weaknesses). 3. Ability to seize high-quality action opportunities and implement them	"Discovery" Market "Innovation" Product "Learning" Professional "Platform" Industry "Idea" Decision "Advantage" and "Attempt"
Bearing capacity (B)	4. Be able to endure the pressure and changes in work, and persist in adversity. 5. Self-adjustment after failure 6. Take timely remedial measures to solve the problems and difficulties in the company's operation	"Experience" Experience "Persistence" Constant "Failure" Growth "Pressure" Abandonment "and" Solution "
Mobility (A)	7. Be able to put ideas into practice and produce certain results. 8. Have participated in campus or social practice 9. Share and discuss ideas with others	"Development" and "Promotion" "Start" Goal "Achieve" Practice "Practice"
Financing capacity (F)	10. Able to finance in various ways 11. Understand and gain support for government policies 12. Have financial management awareness and ability	"Capital" Investment "Economy" Financing "Support" Capital "Acquisition"
Operational capacity (O)	13. Ability to effectively lead, monitor and motivate staff 14. Reasonable allocation of internal human, financial, material and other resources 15. Be able to analyze the company's position in the industry and formulate corresponding strategic plans.	"Management" Team "Resources" Cooperation "Support" Policy "Partners" Partners "Encouragement" Leadership "Ideas"

According to the word frequency table and scale, the relevant classification of word segmentation is carried out for the corresponding indicators, and the classification results are shown in Table 2.

## (2) Data analysis and conclusion

As a research hypothesis, the ability corresponding to the five dimensions of OBAFO has an impact on the ultimate entrepreneurial ability. Therefore, the quantitative calculation formula of entrepreneurial ability is the arithmetic mean of word segmentation frequency corresponding to each ability, which is defined as "word segmentation mean". The mean value of word segmentation of each dimension can show its importance, and the higher the value is, the higher the conversion rate of the dimension's ability to entrepreneurial ability is. That is, the conversion rate from innovation to entrepreneurship.

Through the construction of the model and the analysis of the data, the following entrepreneurial ability equation is established:

$$f_{(x)}=X_1+X_2+X_3+X_4+X_5$$

Where,  $f_{(x)}$  = entrepreneurial ability;  $X_1$  = Opportunity Capability (O);  $X_2$  = bearing capacity (B);  $X_3$  = mobility (A);  $X_4$  = financing capacity (F);  $X_5$  = operational capacity (O);  $Z$  = frequency of each participle;  $N$  = the number of participles for each competency dimension.

$$X_1 = \frac{\sum Z1}{n1}; X_2 = \frac{\sum Z2}{n2}; X_3 = \frac{\sum Z3}{n3}; X_4 = \frac{\sum Z4}{n4}; X_5 = \frac{\sum Z5}{n5}; (n \geq 0)$$

Through the query of word segmentation frequency in Annex 1, the following calculation results are obtained (two decimal places are reserved):

$$X_1 \approx 187.83; X_2 = 104.00; X_3 \approx 149.43; X_4 \approx 108.29; X_5 \approx 127.18$$

To sum up, the following analysis and conclusions are drawn:

### 1. Order of influence degree

According to the results, the five dimensions are opportunity ability, action ability, operation ability, financing ability and bearing ability according to the importance of entrepreneurial ability. Among them, the importance of financing ability and bearing ability is almost equal, and there is no significant data difference.

The results are ordered as follows:  $X_1 > X_3 > X_5 > X_4 > X_2$

### 2. Significance of each ability

The total number of word segmentation is 408 (the frequency is more than 40), and the number of word segmentation whose frequency is more than 200 is 38, accounting for 9.31% of the total number of words. Through the analysis and verification of news, the 38 participles are representative in 164 samples, and the 9 participles selected in the corresponding ability also have analytical significance, so the participles whose frequency is more than 200 are identified as "significant indicators" in this paper. There are 9 significant indicators. The corresponding ability is also significant, the more significant indicators, the stronger the significance.

### 3. Empirical conclusions

The corresponding number of significant indicators in bearing capacity (B) is 0, which represents the significant participle that can reflect its ability characteristics, including 5 significant indicators  $X_1$ , 2 significant indicators  $X_3$ , 1 significant indicator  $X_5$  and 1 significant indicator  $X_4$ . The degree of significance decreases from strong to weak, and the results of significance are consistent with the degree of influence mentioned above.

Opportunity ability (O) is the most important. This result is different from the research trend of scholars. In the current research, the in-depth exploration of opportunity ability is less, because opportunity ability is more vague than other abilities, and empirical exploration is more difficult. But at the same time, there are also empirical results that show that opportunity capability has a greater impact on entrepreneurial performance. Liu Xiaomin, a scholar, believes that opportunity ability is an indispensable core competence for entrepreneurship through empirical research, highlights the transformation role of opportunity ability in learning-innovation-entrepreneurship performance, and emphasizes the importance of opportunity identification ability for entrepreneurship performance, which is consistent with the results of data analysis in this paper and confirms the importance of opportunity ability for entrepreneurship. The opportunity recognition ability and self-cognition ability included in the opportunity ability are the focus and direction of training.

Action ability (A) determines the quality of entrepreneurship, and the importance of action ability ranks second. The analysis of cases also shows the importance of "action". The ancients

also said that "a journey of a thousand miles begins with a single step". Therefore, for college students' innovation and entrepreneurship, a good start and action are much more effective than wait-and-see, and will gain more. The conclusion of this paper on the importance of action ability is also confirmed in the article "Empirical Analysis of the Relationship between Insight, Execution and Enterprise Growth" (Wang Yu, Zhang Lei 2018). They believe that execution is positively related to enterprise growth. Therefore, the ability to act has a great impact on the growth of enterprises, that is, the transformation from innovation to entrepreneurship and the sustainable development of entrepreneurship. It determines the quality of entrepreneurship. At the same time, deepening the reform of innovation and entrepreneurship education also emphasizes the need to strengthen the practice of innovation and entrepreneurship. The essence of strengthening practice is to improve execution, through the construction of diversified platforms and the provision of projects, so that college students can really get in touch with independent innovation and entrepreneurship. To sum up, it once again confirms the importance of the ability to act.

According to the proportion of frequency, the frequency higher than 200 shows the degree of determination of entrepreneurial ability, so the analysis of these participles is helpful to establish the specific objectives of the cultivation of innovative and entrepreneurial ability in Colleges and universities. There are 9 words whose frequency is higher than 200 in the five-dimensional index word segmentation, which are called prominent words. According to the frequency from high to low, they are: Team (492), Product (360), Market (347), Start (330), Innovation (301), Development (283), Professional (245), Capital (209) and Platform (203). For the word "team" with the highest frequency, this element is mentioned in most successful cases, and entrepreneurs also mention it in articles related to experience sharing: "In the end, entrepreneurship is a team cooperation". It can be concluded that the process of entrepreneurship requires constant running-in and persistence, and having a team with reasonable resource allocation is the first step to success.

#### **4. Prospects for the Cultivation of College Students' Innovative and Entrepreneurial Ability**

##### **(1) Model interpretation**

Through the above analysis, this paper argues that the cultivation mode of innovation and entrepreneurship ability is the process of transforming "ability" into "output" and "innovation" into "entrepreneurship" under the background of establishing entrepreneurial universities. Through the significance analysis and importance ranking of the five abilities, Team cooperation, product output, market analysis, action practice, innovative thinking, sustainable development, professional stratification, financial support and platform building corresponding to nine significant indicators are selected as the training methods, and the opportunity ability and action ability which have a higher degree of influence on entrepreneurship are selected as the main objectives of the training mode, so as to improve entrepreneurship. The training purpose of improving the conversion rate of entrepreneurship.

##### **(2) Collaborative innovation construction of entrepreneurial universities**

Innovation and entrepreneurship is not the construction direction of a discipline or a department, but the collaborative innovation relying on entrepreneurial universities. The atmosphere and training objectives of colleges and universities determine the result orientation of teaching subjects such as teacher teams and student groups. Research-oriented universities pay attention to scientific research, and the evaluation indicators of teachers are mainly papers and topics, which are relatively single. There is also a lack of integration with practice in the training of students, and the innovation vitality is low. Therefore, some scholars have also mentioned that entrepreneurial university is the inevitable result of economic



development. Its rise and development provide a new model for accelerating the reform of scientific research system in universities, and have a far-reaching impact on enhancing the vitality of scientific research in universities and stimulating the enthusiasm and creativity of teachers and researchers. [11].

(3) Promote practice, enhance cooperation and build a platform of "government, industry, education and research"

Colleges and universities have the important functions of personnel training, scientific research, social services, cultural heritage and innovation, international exchanges and cooperation, and shoulder the responsibility of providing public goods such as talents, intelligence and culture for the society. The cooperation of government, industry, education and research is an important carrier for colleges and universities to fully perform the five functions. it is also an important way for universities to actively serve the innovation-driven development strategy and actively integrate into the construction of an innovative country. [4]. According to the report on the employment quality of graduates in 2017 released by various universities, the entrepreneurship rate of Chongqing University ranks first among the "double first-class" universities. Its high entrepreneurship rate and achievements in innovation and entrepreneurship development are directly related to the relevant entrepreneurship support policies of Chongqing for young people, college students and returned overseas students. In order to effectively meet the needs of the public for innovation and entrepreneurship, Chongqing has built 300 demonstration public spaces with strong professional service capabilities, 100 universities and research institutes, and 100 enterprises and industry organizations in 2016. [5]. It provides a good platform for mass entrepreneurship, accelerates the development of local innovation and entrepreneurship, and stimulates the entrepreneurial vitality of the city.

The development of innovation and entrepreneurship is a gradual process, and the achievements of Chongqing also prove the importance of building a "government-industry-university-research" platform, which can provide financial support for the cultivation of college students' entrepreneurial ability, provide high-quality projects, and improve the ability and efficiency of team work through practice.

(4) Professional stratification and more targeted training

Through the analysis of cases, most of the college students' entrepreneurship related to Internet, electronics and computer majors is based on technological innovation and entrepreneurship, while the majors related to liberal arts and social sciences have more industry adjustments in the process of entrepreneurship. Therefore, the cultivation of innovation and entrepreneurship in colleges and universities should be hierarchical, targeted and flexible.

At the same time, because of the goal of sustainable development corresponding to the significant indicator "development", the cultivation of management and financial abilities included in the operational ability (O) should be taken as an elective subject to cultivate the basic ability of college students' entrepreneurship, and "business awareness" determines their ability to identify opportunities and the sustainability of entrepreneurship development.

## 5. Conclusion

This paper adopts the method of news text segmentation analysis under the background of big data, shows a large number of successful cases of college students' entrepreneurship experience, through the reading of relevant literature and policy collection, combined with data interpretation, puts forward an innovative, scientific, universal and sustainable development model for the cultivation of college students' innovation and entrepreneurship ability in China. But at the same time there are some limitations, first of all, the description of the news

text because of different platforms, tendentiousness is also different, different writers' writing habits will also lead to the deviation of the results, this subjective factor can not be avoided. Secondly, for the selection of participles, in the process of analysis, although the subjective words such as "we", "they" and "oneself" are eliminated through screening. However, there are still some subjective factors in the classification of word segmentation, which will directly affect the significance of each dimension. Taking the participle "problem" with a frequency of 189 as an example, if it is classified into the bearing capacity (B), and its frequency is close to 200, it can be regarded as a "significant index", and the conclusion that X2 is not significant in this paper will change, but back to the case text itself for analysis. Encountering problems cannot be equated with solving problems, nor can it be equated with persistence. When "solving" and "persistence" have been included in the bearing capacity, the word "problem" has not been chosen as a "significant indicator".

It is inevitable for colleges and universities to change from scientific research to entrepreneurship, and the function of university teachers and the goal of personnel training are also changing, which is a challenge for all colleges and universities. As an important platform for talent export, colleges and universities have gathered young people with the most active thinking and the greatest potential. The related research on innovation and entrepreneurship in colleges and universities is of great significance and irreplaceable value. We hope that through the joint efforts of scholars, we can create a high-quality entrepreneurial environment for colleges and universities, and promote the innovative vitality of college students.

## References

- [1] Ministry of Education of the People's Republic of China, Opinions on Accelerating the Construction of High-level Undergraduate Education and Improving the Ability of Personnel Training in an All-round Way [EB/OL]. (2018-11-20)[2018-10-08]. [http://www.moe.gov.cn/srcsite/A08/s7056/201810/t20181017\\_351887.html](http://www.moe.gov.cn/srcsite/A08/s7056/201810/t20181017_351887.html).
- [2] Man T W Y, Lau T, Chan K F. The competitiveness of small and medium enterprises ☆: A conceptualization with focus on entrepreneurial competencies[J]. Journal of Business Venturing, 2002, 17(2):123-142.
- [3] Zhou Bing. Entrepreneurial Opportunity Identification: Concepts and Factors [J]. Knowledge Economy, 2014 (09): 17-18.
- [4] Higher education in China. How Colleges and Universities Develop the Supply-side Reform of Government-Industry-University-Research Cooperation. [EB/OL] (2018-11-24)[2017-4-19] [http://www.jyb.cn/zggdjj/tjyd/201704/t20170419\\_700020.html](http://www.jyb.cn/zggdjj/tjyd/201704/t20170419_700020.html).
- [5] General Office of the CPC Chongqing Municipal Committee. General Office of Chongqing Municipal People's Government. Implementation Opinions on Developing Mass Creative Space and Promoting Mass Entrepreneurship and Innovation. Yu Wei Ban Fa [2015] No.20.
- [6] Xie Yaping, Liang Surong, Chen Ruijun. Failure Learning, Entrepreneurial Action Learning and Entrepreneurial Competence: The Moderating Role of Grief Recovery Orientation [J]. Management Review, 2017, 29 (04): 47-58.
- [7] Liu Xiaomin. Tacit Knowledge Acquisition, Opportunity Capability and Entrepreneurial Performance [J]. Science and Technology Management Research, 2017, 37 (20): 117-123.
- [8] Wang Feirong, Xu Yongping, Li Zhengwei. Does entrepreneurial failure learning contribute to continuous entrepreneurial intention? A framework study based on cognitive perspective [J]. Technical Economy, 2018, 37 (08): 69-76 + 115.
- [9] Zhang Weiguo, Hao Taotao, Niu Jingjing. The Cultivation Mechanism of Postgraduates' Entrepreneurial Ability in British Universities and Its Enlightenment --Taking Cambridge University as an Example [J]. Academic Degrees and Graduate Education, 2018 (08): 68-72.
- [10] Burton Clark. Establishing an Entrepreneurial University: An Approach to Organizational Transformation [M]. People's Education Press, 2003.



- [11] Yang Canming. Cultivation of Innovative Talents in Colleges and Universities in the New Era [J]. Journal of National Institute of Educational Administration, 2018 (07): 3-7.
- [12] Liang Xiaolu, Zan Haixia. The Path Choice of the Transformation from Research University to Entrepreneurial University: a Case Study of Nanyang Technological University in Singapore [J]. Jiangsu Higher Education, 2018 (11): 12-19.
- [13] Li Gen. The Enlightenment of the Rise of Entrepreneurial University on the Reform of Scientific Research System in Colleges and Universities [J]. China University Science and Technology, 2018 (03): 34-36.
- [14] Wang Yu, Zhang Lei. An Empirical Analysis of the Relationship between Insight, Execution and Enterprise Growth [J]. Statistics and Decision, 2018, 34 (17): 105-108.
- [15] Liu Junyi. Entrepreneurial University: a New Trend in the Development of American Research Universities. Global Education Perspectives, 2008, 37 (12): 42-45 + 51.